

### **REMARKS**

In accordance with the foregoing, claims 1, 3, and 8 have been amended, claim 2 has been cancelled without prejudice or disclaimer, and claims 1, 3, and 8 are pending and under consideration. No new matter is presented in this Amendment.

### **CLAIM OBJECTIONS:**

Claim 2 is objected to for failing to disclose definitions for elements m, n, R, and end group \*. In order to even more particularly point out the aspects of the present invention, claim 1 has been amended to include the aspects of claim 2. In addition, claim 1 has also been amended, so as to recite that R is a terminal acidic functional group, m is a number from 1 to 6, and \* is a connection point of a subsequent bis(oligo-ethylene glycol) benzoate primary constituent.

A disclosure involving a new chemical compound or composition must teach persons skilled in the art how to make the compound or composition. MPEP 608.01(p). In addition, claims should particularly point out and distinctly claim the subject matter which the applicant regards as his invention. MPEP 706.03(d).

However, as would be apparent to one of skill in the art, the "n" recited in general formula 1, which represents a number of the primary constituents included in the membrane, is not particularly limited, and can be set according to the particular characteristics desired in a membrane formed using the primary constituent. Thus, the number of primary constituents need not be specifically recited, for one of skill in the art to comprehend the scope of the present invention.

In addition, the Examiner asserts that claim 2 "is improper according to MPEP" for failing to recite definitions for the above elements. However, Applicants respectfully assert that the Examiner has failed to specifically point out the applicable standard, or where such a standard can be found in the MPEP. Therefore, the Examiner has not provided a rejection that is specific enough for the Applicants to make a meaningful response thereto.

Therefore, this objection has been respectfully traversed. Reconsideration and withdrawal are respectfully requested.

**REJECTIONS UNDER 35 U.S.C. §102:**

Claims 1 and 8 are rejected under 35 U.S.C. §102(b), as being anticipated by Chen et al. (Polymer Journal, V. 35(3), pp. 280-285 (2002)). In particular, the Examiner asserts that Chen teaches a hyper-branched polyimide-type dendritic polymer having sulfonic acid groups at the ends of side chains thereof.

In order to even more particularly point out the aspects of the present invention, claim 1 has been amended, so as to recite that the polymer electrolyte membrane comprises a primary constituent of a poly (bis(oligo-ethylene glycol) benzoate) hyperbranched polymer expressed by general formula 1, as previously recited in claim 2, which has been cancelled without prejudice.

As is admitted by the Examiner, Chen fails to teach such a polymer electrolyte membrane. Therefore, this rejection has been respectfully traversed. Reconsideration and withdrawal are respectfully requested.

**REJECTIONS UNDER 35 U.S.C. §103:**

Claims 1-3 and 8 are rejected under 35 U.S.C. §103(a), as being unpatentable over Ito et al. (U.S. Patent No. 6,924,067) or Itoh et al. (Journal of Power Sources, V 81-82, pp. 824-829 (1999)), in combination or alone, in view of Colombo et al. (U.S. Publication 2006/00947925). In particular, the Examiner asserts that Ito and Itoh teach aromatic hyperbranched polymers having a dihydroxy benzoate connector, but fail to teach or disclose the presently recited terminal acidic functional group.

However, the Examiner asserts that Columbo remedies the deficits thereof, by teaching dendrimeric polymers having terminal acidic functional groups. Specifically, the Examiner asserts that it would have been obvious to modify the polymers of Itoh and/or Ito, so as to carry the same or similar acidic group taught in Columbo, in order to obtain better and more diversified solid electrolyte membranes with improved efficiency.

The rationale to support a conclusion that the claim would have been obvious is that all the claimed elements were known in the prior art, and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 82 USPQ2d at 1395. It can be important to provide evidence of a reason that would have

prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. 82 USPQ2d at 1396. If any of these findings cannot be made, then this rationale cannot be used to support a conclusion that the claim would have been obvious to one of ordinary skill in the art.

With regard to Colombo, disclosed are membranes formed from Frechet-type dendrimers that are surface-functionalized with acidic terminal groups, such as carboxylic acid groups [0020]. Accordingly, the membranes fabricated using such dendrimers have low acid equivalent weights, which Colombo teaches is an improvement over other membranes [0020]. The terminal acidic groups are then cross-coupled, to form stable covalent links between the dendrimers, and thereby form membranes. [0028]

In contrast, the present membrane includes a hyperbranched polymer expressed by general formula 1. As can be seen in general formula 1, the oligo-ethylene oxide terminal side chains are attached to benzene rings, via ester linkages. However, Colombo fails to teach or disclose such ester linkages.

In addition, the present polymer is not surface-functionalized with acidic terminal groups, as is the polymer of Colombo, but rather includes acidic terminal groups throughout the polymer. Therefore, the application of the teachings of Colombo to the polymers of the cited art would not have resulted in the present membrane, as the present polymer is not produced using surface-functionalized dendrimers. Therefore, the cited references fail to teach or disclose all aspects of amended claim 1.

Further, as would be apparent to one of skill in the art, the structure of the present polymer results in a higher acid equivalent weight than the polymer of Colombo. Accordingly, since Colombo teaches that the surface-functionalization of its dendrimers results in a beneficial low acid equivalent weight, Colombo actually teaches away from the presently recited polymer.

In addition, as shown in formula 1 of Ito, the polymer of Ito includes a side chain that includes an alkyl terminal group (R). Thus, the combination of the alkyl terminal group of Ito and acidic terminal group of Colombo would not have resulted in a side chain having an arylene (phenylene) group connected to an acidic terminal group, as recited in present formula 1.

Further, as shown in formula 8 of Itoh, the polymer of Itoh includes a side chain having two acetyl ester groups. Thus, the combination of Itoh and Corrigan would not have resulted in a polymer having only one terminal acidic group, as recited in present formula 1. In other words, the combination of Corrigan and Itoh would have resulted in either a polymer having two acidic terminal groups, or a polymer having a terminal acidic group and a terminal acetyl ester group.

Accordingly, the cited references fail to teach or disclose all aspects of the present claims, and there would have been no motivation to combine the cited references in the manner proposed by the Examiner. Therefore, this rejection has been respectfully traversed. Reconsideration and withdrawal are respectfully requested.

**CONCLUSION:**

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

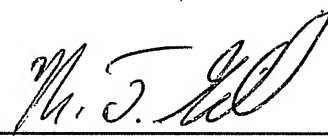
Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

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